CLAIMS

What is claimed is:

1.   An adaptive forward error correction method comprising the steps of :

comparing a count of received data codewords and packets with errors uncorrectable by forward error correction to at least one predetermined threshold of quality; and

adjusting, in response to said comparing step, a size of active data fields of

5   codewords comprised of data packets to one of a plurality of sizes.

2.   The method of claim 1 wherein said adjusting step further comprises the steps of:

increasing a size of said active data fields; and

decreasing a size of blank data fields of said codewords comprised of data

packets;

5   wherein a sum of said sizes is maintained before and after said adjusting step.

3.   The method of claim 2 wherein said blank data fields are comprised of data having known values.

4.   The method of claim 3 wherein said data comprising blank data fields is discarded by a forward error correction decoder after decoding each of said codewords.

5.   The method of claim 1 wherein said adjusting step further comprises the steps of:

decreasing a size of said active data fields; and

increasing a size of blank data fields of said codewords comprised of data

packets;

5   wherein a sum of said sizes is maintained before and after said adjusting step.

6.   The method of claim 5 wherein said blank data fields are comprised of data having known values.

7.   The method of claim 6 wherein said data comprising blank data fields are discarded by a forward error correction decoder after decoding each of said codeword.

8.   The method of claim 1 wherein said adjusting step is carried out by a data communications hub.

9.   The method of claim 1 further comprising the step of directing a data communications subscriber station to carry out said adjusting step.

10.   The method of claim 1 wherein said at least one threshold comprises an upper threshold of quality and in response to said upper threshold of quality being exceeded said adjusting step further comprises the steps of:

indent increasing a size of said active data fields; and

5 indent decreasing a size of blank data fields of said codewords comprised of data packets.

11.   The method of claim 1 wherein said at least one threshold comprises a lower threshold of quality and in response to said lower threshold of quality not being met said adjusting step further comprises the steps of:

indent decreasing a size of said active data fields; and

5 indent increasing a size of blank data fields of said codewords comprised of data packets.

12.   The method of claim 1 wherein said at least one threshold comprises at least an upper threshold of quality and a lower threshold of quality and said adjusting step further comprises the steps of:

indent increasing a size of said active data fields and decreasing a size of blank data

5 indent fields in response to said upper threshold of quality being exceeded; and

indent decreasing a size of said active data fields and increasing a size of said blank data fields in response to said lower threshold of quality not being met.

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13. The method of claim 12 wherein said adjusting step further comprises the step of:

maintaining a size of said active data fields and said blank data fields in response to said

upper threshold of quality not being met and said lower threshold of quality being exceeded.

14. The method of claim 1 wherein said count of received data codewords and

packets with errors is carried out by a data transmission subscriber station, and comprises a count

of at least one of a group consisting of:

codeword errors;

5   codeword errors destined for said subscriber station;

packet discards; and

payload discards for packets destined for said subscriber station.

15. The method of claim 14 further comprising the step of:

sorting said count according to data stream

16. The method of claim 14 further comprising the steps of:

maintaining a count by an RF data transmission hub of total number of codewords

transmitted to said subscriber station, total number of packets sent to said subscriber station, and

total data payload sent to said subscriber station, since a previous comparing step;

5   sorting said count according to data stream; and

transmitting to said hub said count of received data codewords and packets with errors

from said subscriber station.

17. The method of claim 1 wherein said count of received data codewords and

packets with errors is carried out by an RF data transmission hub station, and comprises a count

of at least one of a group consisting of:

codeword errors for each data stream received by said hub;

5   aggregate codeword errors received by said hub;

packet discards for each of said data streams; and
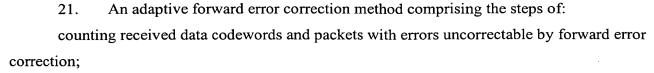
aggregate packet discards by said hub.

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18.   The method of claim 17 further comprising the step of:

sorting said count according to a subscriber station transmitting said data codewords and

packets.

19.   The method of claim 17 further comprising the step of:

sorting said count according to data stream.

20.   The method of claim 17 further comprising the steps of:

retaining said count by said hub as a previous count; and

continuing said count.

21.   An adaptive forward error correction method comprising the steps of:

counting received data codewords and packets with errors uncorrectable by forward error correction;

evaluating the results of said counting step in light of previous counts of received data

5   codewords and packets with errors uncorrectable by forward error correction to obtain a

difference;

calculating a type of quality measure using at least one of said results of said counting step, said previous counts and said difference;

comparing the results of said calculating step to at least one predetermined threshold of

10   quality; and

adjusting, in response to said comparing step, a size of active data fields and a size of

blank data fields of codewords, said codewords comprised of data packets.

22.   The method of claim 21 wherein said at least one threshold comprises an upper threshold of quality and in response to said upper threshold of quality being exceeded said adjusting step further comprises the steps of:

increasing a size of said active data fields; and

5   decreasing a size of blank data fields comprised of data packets.

23.   The method of claim 21 wherein said at least one threshold comprises a lower threshold of quality and in response to said lower threshold of quality not being met said adjusting step further comprises the steps of:

decreasing a size of said active data fields; and

5   increasing a size of blank data fields comprised of data packets.

24.   The method of claim 21 wherein said at least one threshold comprises at least an upper threshold of quality and a lower threshold of quality and said adjusting step further comprises the steps of:

5   increasing a size of said active data fields and decreasing a size of blank data fields comprised of data packets in response to said upper threshold of quality being exceeded; and

decreasing a size of said active data fields and increasing a size of said blank data fields in response to said lower threshold of quality not being met.

25.   The method of claim 24 wherein said adjusting step further comprises the step of:

maintaining a size of said active data fields and said blank data fields in response to said upper threshold of quality not being met and said lower threshold of quality being exceeded.

26.   The method of claim 21 wherein said blank data field is comprised of data having known values.

27.   The method of claim 27 wherein said data with known values is discarded by a forward error correction decoder after decoding each of said codewords.

28.   The method of claim 21 wherein said adjusting step is carried out by an RF data communications hub.

29.   The method of claim 21 further comprising the step of :

directing an RF data communications subscriber station to carry out said adjusting step.

30.   The method of claim 21 wherein said counting step is carried out by an RF data transmission subscriber station, and comprises a count of at least one of a group consisting of:

codeword errors;

codeword errors destined for said subscriber station;

5   packet discards; and

payload discards for packets destined for said subscriber station.

31.   The method of claim 30 further comprising the step of:

sorting said count according to data stream

32.   The method of claim 30 further comprising the steps of:

retaining a count by an RF data transmission hub of total number of codewords transmitted to said subscriber station, total number of packets sent to said subscriber station, and total data payload sent to said subscriber station, since a previous comparing step;

5   sorting said count according to data stream; and

transmitting said count of received data codewords and packets with errors to said hub.

33.   The method of claim 21 wherein said counting step is carried out by an RF data transmission hub station, and comprises a count of at least one of a group consisting of:

codeword errors for each data stream received by said hub;

aggregate codeword errors received by said hub;

5   packet discards for each of said data streams; and

aggregate packet discards for packets received by said hub.

34.   The method of claim 33 further comprising the step of:

sorting said count according to a subscriber station transmitting said data codewords and packets.

35.   The method of claim 33 further comprising the step of:

sorting said count according to data stream.

36.   The method of claim 33 further comprising the steps of:

retaining said results of said counting step as one of said previous counts; and

continuing said counting step.

37.   An RF data transmission system employing adaptive forward error correction, said system comprising:

at least one RF data communications hub transmitting and receiving forward error correction encoded data codewords comprised of data packets; and

5   at least one RF data communications subscriber station transmitting and receiving forward error correction encoded data codewords comprised of data packets, wherein each of said subscriber stations count received data codewords and packets with errors uncorrectable by forward error correction from said hub and said subscriber station transmits said count to said hub;

10   wherein said hub calculates a type of quality measure using said count, compares said type of quality measure to predetermined upper and lower thresholds of quality, and said hub:

increases a size of active data fields of said codewords and decreases a size of blank data fields of said codewords, in response to said type of quality measure exceeding said upper threshold of quality; and

15   decreases a size of said active data fields and increases a size of said blank data fields, in response to said type of quality measure failing to meet said lower threshold of quality.

38. The system of claim 37 wherein said hub counts received data codewords and packets with errors uncorrectable by forward error correction from each of said subscriber stations, calculates a type of quality measure from each of said subscriber stations using said count of errors from each of said subscriber stations, compares said type of quality measure from each of said subscriber stations to predetermined upper and lower thresholds of quality for that subscriber station, and said hub directs that subscriber station to:

increase a size of active data fields of said codewords and decrease a size of blank data fields of codewords transmitted from that subscriber station to said hub, in response to said type of quality measure exceeding said upper threshold of quality; and

decrease a size of said active data fields and increase a size of said blank data fields transmitted from that subscriber station to said hub, in response to said type of quality measure failing to meet said lower threshold of quality.

39. The system of claim 38 wherein said count of said data codewords and packets with errors uncorrectable by forward error correction received by said subscriber station are sorted by data stream.

40. The system of claim 38 wherein said count of said data codewords and packets with errors uncorrectable by forward error correction received by said hub are sorted by data stream.

41. The system of claim 38 wherein said calculation of type of quality measure is carried out for each data stream from each of said subscriber stations and said comparison of said type of quality measure to said thresholds is carried out for each data stream from each of said subscriber stations using thresholds for each of said data streams.

42. The system of claim 41 wherein said increases and decreases by said subscriber stations in said field sizes are directed by said hub for each data stream transmitted by each subscriber station.

43. The system of claim 38 wherein said blank data fields are comprised of data having known values.

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44.   The system of claim 43 wherein said data with known values is discarded by a forward error correction decoder after decoding said codewords.

45.   The system of claim 38 wherein said hub maintains a size of said active data fields and said blank data fields in response to said upper thresholds of quality not being met and said lower thresholds of quality being exceeded.

46.   The system of claim 38 wherein said received data codewords and packets with errors comprises at least one of a group consisting of:
   codeword errors;
   codeword errors destined for said subscriber station;
5   packet discards;
   payload discards for packets destined for said subscriber station;
   codeword errors for each data stream received by said hub;
   aggregate codeword errors received by said hub;
   packet discards for each of said data streams; and
10   aggregate packet discards for packets received by said hub.

47.   The system of claim 46 wherein said subscriber station sorts said count according to data stream.

48.   The system of claim 46 wherein said hub sorts said counts according to subscriber station transmitting, and data stream containing, said data codewords and packets.

49.   The system of claim 46 wherein said hub maintains a count of total number of codewords for each data stream transmitted to said subscriber station, total number of packets for each data stream sent to said subscriber station, and total data payload sent to said subscriber station.

50.   The system of claim 38 wherein a size of said data field is contained in header information associated with said codewords.

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51.   The system of claim 38 wherein said hub directs said subscriber via a data stream separate from data streams used for transmission of said data packets.

52.   The system of claim 38 wherein said hub directs said subscriber stations via a control channel separate from channels used for transmission of said data packets.

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